



**A revision of the species of *Cafius* Curtis
from the west coast of North America
with notes of the east coast species
(Coleoptera: Staphylinidae)**

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Abstract. Ten west coast species of *Cafius* are described in detail. Lectotypes have been selected and are recorded for 8 of them. *Cafius bistriatus* (Erichson) and *Cafius caribeanus* Bierig are reported for the first time from western North America. Five east coast species are discussed. *Cafius sericeus* Holme does not occur in North America. The species previously reported under that name is *Cafius aguayoi* Bierig. Separate keys are presented for the west coast and east coast species. Drawings of the dorsal aspect and of the aedeagus of each species are given.

INTRODUCTION

Members of genus *Cafius* are generally restricted to seashores and the margins of rivers near the sea throughout the world. These insects are highly mobile, both on sandy beaches and in the air.

This study was undertaken because of the difficulty of distinguishing members of 2 Pacific coast species, *Cafius sulcicollis* (LeConte) and *Cafius decipiens* (LeConte), from the existing literature. Examination of type specimens has resolved that problem and indicated the presence of 2 species not previously reported from the west coast of North America.

According to Blackwelder (1952), the name *Cafius* was validated by Curtis in 1829 by "virtual monotypy." He said, "Curtis listed three species in 1829, but two of these are nomina nuda." The type species is *Cafius xantholoma* (Gravenhorst), a European species.

A few species of genus *Philonthus* were originally described in *Cafius* because of their seashore habitat, including one, *Philonthus nudus* (Sharp), from the west coast of North America. Members of *Philonthus* do not have the pronotal side margin deflexed, so that in *Philonthus* the large setigerous central puncture is on the marginal carina or removed from it by no more than the width of the puncture. In *Cafius*, and most other genera of the subfamily Staphylininae, the pronotal side margin is strongly deflexed in front so that the large central setigerous puncture is removed from the lateral carina by at least 3 × the width of the puncture. This is an excellent character for separating members of *Cafius* from those of *Philonthus*. *Philonthus nudus* (Sharp) (= *Philonthus johnsoni* [Fall]) was treated as a *Cafius* by Sharp (1874), Fall (1916) and Koch (1936); but it is obviously a *Philonthus*, as pointed out by Moore (1965). Another character useful in separating members of the 2 genera is dilation of the anterior tarsus. In *Cafius*, the anterior tarsus of both sexes is usually broadly dilated. In *Philonthus nudus*, the anterior tarsus is dilated very feebly in males and not at all in females.

Fifty-three species of *Cafius* are presently recognized. The majority of these are from temperate regions, although several species are widespread in the tropics. Four species are known from Europe, 4 from Japan, 12 from Australia, Tasmania and New Zealand, and

13 from North America. Of the North American species, 10 are found on the Pacific coast, 5 on the east coast and the West Indies, 2 of the species being common to both regions.

The first 2 species to be described from Pacific North America, *Cafius femoralis* and *Cafius canescens*, described by Mäklin (1852), were from Alaska. In 1863, LeConte described *Cafius opacus*, *Cafius dubius* (a synonym of *C. opacus*), *Cafius lithocharinus*, *Cafius decipiens*, and *Cafius sulcicollis* all from San Diego, California. Horn revised the North American species in 1884 and added 2 new species from California, *Cafius seminitens* and *Cafius luteipennis*. Fall (1916) described an insect from Washington as *Cafius johnsoni*. This species was treated as a subspecies of *Cafius nudus* (Sharp) from Japan by Koch (1936), and later removed to *Philonthus* by Moore (1965). Koch (1936) revised the world species of *Cafius*, but described no new North American species. Hatch (1957) treated the 5 *Cafius* species known from the Pacific Northwest and included good illustrations of them. The present study adds 2 species to the list of Pacific North American species.

Cafius has been divided into a number of subgenera. The North American species have been assigned to several of these subgenera. We feel that the subgenera which have been applied are poorly conceived and do not reflect phylogeny. Consequently we have not used the subgeneric category in this study.

Descriptions of larvae and pupae and notes on ecology have been provided for 4 of these species by James et al. (1971) and for 1 by Moore (1975). They observed that both larvae and adults are predaceous. Orth et al. (1978) found noxious beach flies to be less abundant when large numbers of staphylinids, mostly species of *Cafius*, were present in wrack where these flies were breeding. When staphylinids were scarce or absent, fly larvae were present in great numbers in the wrack and adult flies swarmed on the beach. They speculated that, under normal conditions, beach flies were under good natural biological control by wrack-inhabiting staphylinids.

METHODS

All measurements refer to greatest width or length of a given part. Length of the tempora is from the bottom of the eye to a line tangential to the base of the head. Suture of the elytra is measured from the posterior tip of the scutellum to a line tangential to the apices of the elytra.

Male genitalia, particularly the shape and relative lengths of the aedeagus and paramere, offer good characters for separating members of some of the species. When viewed from the side, the paramere usually touches or closely approaches the aedeagus at 2 points besides its basal attachment to the aedeagus, one near its middle and the other near its apex. These are raised areas on the aedeagus; so we have called them the **middle tumescence** and the **apical tumescence**. The relative distance of these 2 points from the basal attachment, from one another, and from the apex of the paramere are useful characters in distinguishing some species.

We have examined type material in the LeConte and Horn collections in the Museum of Comparative Zoology (MCZ), Harvard University. These collections consist of series of various numbers of specimens described by the above persons, as well as specimens of *Cafius canescens* and *Cafius femoralis* from Mäklin's type series.

Because there is some question as to which specimens constitute the original type series of some of these species, and to justify our choice of lectotypes, we have listed in full the data present on all specimens from both the LeConte and Horn collections.

In a letter written by John L. LeConte to Alexander Agassiz in 1875 and later published in the *Coleopterist's Bulletin* (LeConte, 1961), LeConte stated, in reference to his collection, "It has been enriched by the extreme liberality and courtesy of many distinguished European entomologists who have sent me even the second specimens of many North American species, which were otherwise unobtainable at that time. I have thus nearly a complete series of the species described from the West Coast by Eschscholtz,

Mannerheim and Mäklin." This information was taken into consideration in selecting lectotypes for Mäklin's species from the LeConte collection.

A single specimen (usually the first in each series) in the LeConte and the Horn collection bears a red label reading "Type" and a number. These were apparently affixed by N. Banks, but never published, so they are not lectotypes. In most cases, we have selected specimens which we felt were more suitable as lectotypes than those specimens with the red "Type" labels.

The following abbreviations of names of repositories have been used: (CAS)-California Academy of Sciences, San Francisco; (ERIC)-Entomological Research Institute of Canada, Ottawa; (FMNH)-Field Museum of Natural History, Chicago; (MCZ)-Museum of Comparative Zoology, Harvard; (UCR)-University of California, Riverside; (USNM)-United States National Museum, Washington, D.C.

KEY FOR IDENTIFICATION OF *CAFIUS* OF WESTERN NORTH AMERICA

- A. Pubescence of each abdominal tergite arranged on each side in the form of a cowlick so that outer hairs lie diagonal to lateral margin.
- B. Two terminal sternites contrastingly more densely pubescent than preceding sternites1. *C. seminitens* Horn
- BB. Two terminal sternites not more densely pubescent than preceding sternites2. *C. canescens* (Mäklin)
- AA. Pubescence of abdominal tergites entirely longitudinal.
- C. Tenth antennomere longer than wide.
- D. Suture of elytra shorter than pronotum3. *C. opacus* (LeConte)
- DD. Suture of elytra not shorter than pronotum4. *C. femoralis* (Mäklin)
- CC. Tenth antennomere not longer than wide.
- E. Punctures of undersurface of head partly coalescent5. *C. lithocharinus* (LeConte)
- EE. Punctures of undersurface of head not coalescent.
- F. Elytra bright buff6. *C. luteipennis* Horn
- FF. Elytra reddish-brown to piceus.
- G. Head reddish-brown7. *C. decipiens* (LeConte)
- GG. Head black.
- H. Disc of pronotum strongly reticulate, dull8. *C. sulcicollis* (LeConte)
- HH. Disc of pronotum feebly or not reticulate, shining.
- I. Gula strongly reticulate and granulate9. *C. bistriatus* (Erichson)
- II. Gula with fine wavy lines10. *C. caribeus* Bierig

1. *Cafius seminitens* Horn

Figs. 1A, 5A, 6A-C.

Cafius seminitens Horn, 1884, Trans. Amer. Ent. Soc. 11:235; Koch, 1936, Publ. Mus. Ent. Pietro Rossi, 1:183; Dvořák, 1957, Ent. News, 68:15 Fig. 1-2 (♂); Hatch, 1957, Univ. Wash. Publ. Biol. 16:211; Moore, 1965, Coleopt. Bull. 19:98 Fig. 7 (pt.); James, Moore and Legner, 1971, Trans. San Diego Soc. Nat. Hist. 16:282 (larva), 283 Fig. 2 (larva), 285 (larva), 286 Fig. 6 (pupa); Moore, 1975, Pan-Pac. Ent. 51:140 (larva); Orth, Moore and Fisher, 1978, Wasmann Jour. Biol. 35:175 Fig. 5 (toto), 181, 182, 186 (ecology).

Description of lectotype.—♂

This male from the Horn collection in MCZ is labeled as follows: "Cal", "Horn coll/H2259", "*seminitens*/____[?] Calif." and "Lectotype/*Cafius seminitens*/Horn desig. '78/ R.E. Orth, I. Moore."

Type locality.—"California sea coast."

The lectotype is the only specimen in the Horn collection. The following specimens

are in the LeConte collection: 1 female with a gold disc (California), a red label reading "Type 7328" and white labels reading "*P. seminitens* Hn." and "LeConte collection"; a male with a gold disc, a "σ" symbol and "LeConte collection"; a specimen with a "σ" symbol, "Cal." and "LeConte collection" labels; and 1 with "σ", "Cala." and "LeConte collection" labels.

Length.—9.1 mm.

Color.—Largely dark brown, with head piceus and lower edge of elytral epipleura and humerus infusate to yellow.

Head.—Quadrate, wider than long, slightly wider than pronotum, widest near middle of tempora which are noticeably bulbous; eye slightly more than half as long as tempora; disc of head with a short central longitudinal impression, with 6 to 8 large widely spaced punctures on each side of midline and several more closely placed punctures behind eye; surface with very faint strigulose ground sculpture in impressions, otherwise polished; undersurface almost impunctate, with distinct strigulose ground sculpture; gula densely reticulate; antenna hardly longer than head; 10th segment wider than long.

Pronotum.—Wider than long, widest near apical angles; front margin nearly straight, apical angles narrowly rounded, sides gently arcuate into broadly rounded basal angles and arcuate base; disc with a shallow central longitudinal impression and a series of irregularly spaced punctures on each side of midline, with a few scattered punctures at sides; surface without ground sculpture except very faintly in the 2 rows of discal punctures.

Elytra.—With suture somewhat shorter than length of pronotum; each elytron slightly narrower than sutural length; surface very densely and uniformly punctured throughout.

Abdomen.—With acrocostal sutures of basal tergites wavy, with a central wide shallow blunt posteriorly directed cusp; more sparsely but as coarsely punctured as elytra, reticulate between punctures; pubescence coarse, silver colored, diagonally arranged near midline and at sides, the latter somewhat in the manner of a cowlick. First 5 visible tergites with a large impressed puncture centrally on each side of midline. Sternites 5 and 6 almost twice as densely punctured and pubescent as preceding sternites. Apical margin of 6th sternite with a triangular emargination about as deep as wide, without a membranous margin. In ventral view, aedeagus quite blunt at its apex as in *Cafius decipiens* males; but paramere much shorter relative to the aedeagus, than that of *C. decipiens* males and has more pegs on its inner face.

Male characters.—First 4 segments of the anterior tarsus broadly dilated. Head sometimes proportionately much wider than in female. Apical margin of 6th sternite with a triangular emargination.

Female characters.—Anterior tarsus almost as broadly dilated as in male. Head uniformly small. Apical margin of 6th sternite entire.

Variation.—Head and pronotum discs are, in most adults, more shiny than in those of *Cafius canescens*. The 2 rows of longitudinal punctures on the pronotal disc are not consistent. One specimen which we have seen has only a single puncture on each side near the apical margin. Most specimens have 6 to 8 punctures on each side; one has as many as 13; the rows always seem to be interrupted in the middle. In some specimens the pale color of the elytral humerus extends along the basal margin and also includes part of the scutellum.

Notes.—Members of this species closely resemble those of *Cafius canescens* but can be distinguished from the latter by their silvery pubescent, short antennae, wavy acrocostal suture and, particularly their densely pubescent 5th and 6th sternites.

The larva and pupa were described and notes on ecology were provided by James et al. (1971).

We have examined 870 specimens.

Distribution.—This species is known from British Columbia to Rosario, Baja California del Norte, Mexico, and undoubtedly extends farther south along the unexplored coast of Baja California, probably at least as far as Punta Eugenia, Baja California Sur. According to Orth et al. (1978), it was abundant at Refugio State Beach, Santa

Barbara County, California, in the spring and summer and was present there in most other months, but only rarely encountered during midwinter. Besides the type specimens, we have seen the following:

BRITISH COLUMBIA. Queen Charlotte Island, Keen (1; ERIC); Masset, Graham Island, Mrs. Clark (1; MCZ); Courtenay, 15 June 35 (1; ERIC); Metchosin, W. Victoria, 29 May 58, Lindroth (1; ERIC).

WASHINGTON. Seattle, King County, 30 June 66, L. Russell (2; UCR).

OREGON. Newport, Lincoln County, 17-21 July, Wickham (1; MCZ); Glenada, Lane County, 20 Aug. 41, B. Malkin (1; FMNH); Glenada, Lane County, 8 June 46, B. Malkin (3; FMNH); Coos Bay, Coos County, 6 Aug. 23, H. Notman (1; ERIC).

CALIFORNIA. Samoa Beach, Humboldt County, 27 Jan. 56, P.S. Bartholomew (8; CAS); San Miguel Island, Santa Barbara County, 20 June 10, V.W. Owen (3; CAS); many specimens from many localities from Marin County to San Diego County throughout the year but mostly from May to August.

MEXICO, BAJA CALIFORNIA NORTE. Many specimens from north of Ensenada mostly in July and August (UCR, ERIC); Ensenada, 31 Mar. 47, B. Malkin (1; FMNH); Ensenada, 3-5 June 05, F.X. Williams (1; CAS); Ensenada, 18 June 19, J.R. Steven (13; CAS); Ensenada, 5 July 65, E. Schlinger (1; UCR); Ensenada, 16 Aug. 50, I. Moore (1; ERIC); Estero Beach, 20 July 60, I. Moore (1; ERIC); Colonia Guerrero, 28 May 50, I. Moore (5; ERIC); Laguna Santa Maria, 7 Sep. 55, I. Moore (2; ERIC); 15 mi N. Rosario, 1 Aug. 38, Ross & Michelbacher (8; CAS).

2. *Cafius canescens* (Mäklin)

Figs. 1B, 5B, 6D-E.

Philonthus canescens Mäklin, 1852, Bull. Soc. Imp. Moscow, 25:313.

Cafius canescens (Mäklin), Horn, 1884, Trans. Amer. Ent. Soc. 11:235; Casey, 1885, Bull. Calif. Acad. Sci. 1:337 Fig. 4 (pt.); Koch, 1936, Publ. Mus. Ent. Pietro Rossi 1:181 Fig. 2c (pt.), 183; Hatch, 1957, Univ. Wash. Publ. Biol. 16:211, Pl. 27 Fig. 5 (toto); Dvořák, 1957, Ent. News 68:18 Fig. 3-4 (♂); James, Moore and Legner, 1971, Trans. San Diego Soc. Nat. Hist. 16:281 Fig. 1 (larva), 282 (larva), 284 (larva), 285 Fig. 5 (pupa), 288 (pupa); Moore, 1975, Pan-Pac. Ent. 51:140; Orth, Moore and Fisher, 1978, Wasmann Jour. Biol. 35:175 Fig. 4 (toto), 181, 182, 185 (ecology).

Description of lectotype.—♀

Length.—8.1 mm.

Color.—Largely piceus, with lower edge of elytral epipleura and humeral region pale.

Head.—Quadrate, slightly wider than long, lateral basal angles broadly rounded; eye a little longer than tempora; disc of head impunctate; area behind eyes and narrowly along base with large umbilicate punctures separated by their own diameters or less; disc of head with a shallow central longitudinal impression and a broad shallow circular impression on each side between eye and central groove; densely reticulate throughout; undersurface sparsely and coarsely punctured and densely reticulate; gula densely reticulate; antenna distinctly longer than head, 10th segment distinctly transverse.

Pronotum.—Wider than long; apex straight, apical angles rounded, sides nearly straight to broadly rounded basal angles, base gently arcuate; disc largely impunctate except for a longitudinal row of about 15 moderate-sized punctures in a groove on each side of midline; with rather dense setigerous punctures along side margins, particularly anteriorly; surface densely reticulate throughout.

Elytra.—With suture slightly shorter than length of pronotum; each elytron slightly wider than half of sutural length; surface very densely and uniformly punctured throughout.

Abdomen.—More sparsely but as coarsely punctured as elytra; reticulate between punctures, with acrostical suture straight; pubescence coarse, golden, diagonally arranged near midline and at sides, the latter somewhat in the manner of a cowlick. First 5 visible tergites each with a large impressed puncture centrally on each side of midline.

Sternites uniformly punctured and pubescent throughout.

This female from the LeConte collection at MCZ has the right antenna missing beyond the 7th segment and is labeled as follows: "*canescens* Mäklin/Kodiak", "J. LeConte/collection", "lectotype/*Cafius canescens*/Mäklin desig. '78/R.E. Orth, I. Moore."

Type locality.—The original description gives the type locality as "Insula Edgecombe sub fuscis rejectis" (Edgecome Island, beneath wrack.) Because this is the only specimen in the LeConte collection which could be one of Mäklin's cotypes, we have chosen it as the lectotype. In the LeConte collection, there is also 1 male with a gold disc (California), a red label reading "*P. canescens* Mäklin."; another male with a gold disc; a male labeled "Cal." with a prominent ink dot under the C; and a male labeled "Cala."

Male characters.—First 4 segments of anterior tarsus broadly dilated. Apical margin of 6th sternite with a large triangular emargination as deep as wide, bottom of the emargination with a membrane with an oval margin. Head of most males larger than in females, in some males also wider than pronotum. Aedeagus differs from that of males of other Pacific coast species in being acutely pointed at its apex. Paramere relatively shorter than in males of other species, being hardly more than $\frac{1}{2}$ the length of the aedeagus.

Female characters.—Anterior tarsus about as widely dilated as in male. Apical margin of 6th sternite entire.

Variation.—The extent of the pale humeral and elytral epipleural area varies slightly. In some specimens, reticulation of the disc of the head and pronotum is not strong.

Notes.—Adults of *Cafius canescens* and *C. seminitens* are easily recognized among the Pacific coast species of *Cafius* by the irregular arrangement of pubescence on the abdomen. In the other species, pubescence is regular and strictly longitudinal. In these 2, the pronotum is wider than long, a condition which occurs otherwise only in some males of *C. lithocharinus*. *Cafius canescens* adults differ from *C. seminitens* adults particularly in the lack of dense pubescence on the 2 terminal sternites, in the shorter antennae, reticulate disc of the head and pronotum, and the straight acrostical suture.

Description of larva and pupae and notes on ecology were provided by James et al. (1971).

We have seen 5197 specimens.

Distribution.—This species is known from Kodiak, Alaska, to El Tomatal, Baja California Norte, Mexico. Its range undoubtedly extends much farther south along the unexplored coast of Baja California, probably at least to Punta Eugenia, Baja California Sur. It is the commonest species of *Cafius* in the spring and summer on southern California beaches. Adults are abundant in wrack, but can also be seen flying along the beach and alighting on sand. Orth et al. (1978) reported adults at Refugio State Beach, Santa Barbara County, California, in all months of the year except January, but most abundantly in the spring. Besides the type specimens, we have seen the following:

ALASKA. Kukal Bay, 5 July 99, T. Kincaid (7; USNM); Mt. Pariat, Alaska Peninsula, 7 Sep. 13, E.C. Van Dyke (1; ERIC); Propoff Island, 5 July 99, T. Kincaid (11; USNM); Sitka, Liebeck (1; MCZ).

BRITISH COLUMBIA. Courtenay, Gregson (1; CAS); Kyle Bay, 6 May 32, Gregson (3; ERIC); Q[ueen] C[hari]lotte Isl[ands], J.H. Keen (1; ERIC); Masset, Graham Island, Mrs. Clark (1; MCZ); Tofino, July 26, Spencer (1; CAS); Vancouver, 23 July 32, H.B. Leech (8; ERIC); Victoria, Hubbard & Schwartz (1; USNM).

WASHINGTON. Many localities mostly in the warm months.

OREGON. Many localities mostly in the warm months.

CALIFORNIA. West Cove, Catalina Island, Los Angeles County, 11-14 July 71, J. Pinto (1; UCR). Many localities, the majority from Marin County to San Diego County, mostly in the warm months.

MEXICO, BAJA CALIFORNIA NORTE. La Misión de San Miguel, May-Aug. 50, I. Moore (257; ERIC); La Salina, July-Aug. 71, I. Moore (1117; UCR); Colonia Guerrero, 28 May 50, I. Moore (71; ERIC); Colonia Guerrero, 16 Aug. 50, I. Moore (8; ERIC); El Tomatal, 18 June 74, V. Lee (1; CAS).

3. *Cafius opacus* (LeConte)

Figs. 1C, 5C, 6F-G.

Philonthus opacus LeConte, 1863, Smith. Misc. Coll. VI, No. 140:40.*Cafius opacus* (LeConte), Horn, 1884, Trans. Amer. Ent. Soc. 11:235,239; Koch, 1936, Publ. Mus. Ent. Pietro Rossi, 1:192; Orth, Moore and Fisher, 1978, Wasmann Jour. Biol. 35:176 Fig. 8 (toto), 182, 187 (ecology).*Philonthus dubius* LeConte, 1863, Smith. Misc. Coll. VI, No. 140:39.*Cafius dubius* (LeConte), Horn, 1884, Trans. Amer. Ent. Soc. 11:244.*Description of lectotype.*—♂*Color.*—Largely bright reddish-brown with an indistinctly darker area on disc of head near each eye, entire disc of each elytron darker with margins pale, and basal abdominal segments nebulously darker.*Head.*—Quadrate, somewhat wider than long, lateral basal angles broadly rounded; eye small, about $\frac{2}{3}$ as long as tempora; punctures of upper surface relatively small, simple, separated mostly by more than their diameters, with a very narrow inconspicuous impunctate strip through middle; ground sculpture finely, densely reticulate throughout; under-surface with puncturation and ground sculpture very similar to that above; gula finely and densely reticulate; antenna about $\frac{1}{3}$ longer than combined lengths of head and pronotum, 10th segment $\frac{1}{2}$ longer than wide.*Pronotum.*—About $\frac{1}{2}$ longer than wide, apex arcuate, widest near broadly rounded apical angles, sides almost straight but just perceptibly concave before broadly rounded basal angles, base arcuate; surface with simple punctures very similar in size to those of head, regularly arranged from impunctate central area to lateral margin, central impunctate area clearly defined and slightly elevated above rest of surface; surface densely and finely reticulate throughout.*Elytra.*—With suture about $\frac{2}{3}$ length of pronotum; each elytron about $\frac{3}{4}$ as wide as sutural length; surface very finely and densely sculptured, punctures hardly noticeable.*Abdomen.*—With acrocostal suture straight; surface finely rather densely punctured and reticulate; pubescence fine, longitudinal throughout.This male in the LeConte collection in MCZ has a gold disc (California) and a small ♂ symbol, beneath which is a red label reading "Type 6291" and a white label reading "*P. opacus* LeC. S.D." We have affixed a yellow label reading "Lectotype/*Cafius opacus*/LeConte desig. '78/R.E. Orth, I. Moore."*Type locality.*—San Diego, California.

Besides the lectotype, there are 2 males and a female bearing gold discs in the LeConte collection, the males each with a small ♂ symbol. There are also 2 females with "Cala." labels, each with a small check in ink under the letter C. Another pin carries 2 cards, each of which has 2 specimens glued to it and a "Cal." label with a conspicuous ink dot under the letter C. These last 6 specimens may or may not be a part of the original series.

Male characters.—First 4 segments of anterior tarsus broadly dilated; apical margin of 6th sternite with a large oval emargination surrounded by a narrow membranous margin. Genitalia similar to those of *C. bistriatus* males but pegs on inner face of paramere more numerous and tightly clustered at apex of paramere than in the latter.*Female characters.*—Anterior tarsus about as broadly dilated as in male; apical margin of 6th sternite is entire.*Variation.*—Color, particularly of the head, abdomen and sometimes the elytra, varies from bright reddish-brown to dark reddish-brown.The single male specimen labeled *C. dubius* LeConte in the LeConte collection has a gold disc (California), a white label reading "*P. dubius* LeC. S.D." and a red label reading "Type 6292." It is a dark specimen of *C. opacus*. The genitalia have been dissected and are in glycerine in a plastic capsule on the pin. The type locality is "San Diego, California," LeConte 1863.*Notes.*—Adults of this species are easily distinguished from those of all other Pacific coast species of *Cafius*, except *C. femoralis*, by their elongate 10th antennomere. They

differ from *C. femoralis* adults in having shorter elytra in which the suture is shorter than the pronotum. In the latter species, the elytral suture is as long as the pronotum.

The immature stages have not been described.

We have seen 214 specimens.

Distribution.—This species is known from Refugio State Beach, Santa Barbara County, California, to Socorro Dunes, Baja California Norte. Orth et al. (1978) reported adults from Santa Barbara County, California, from September to May. Besides the type specimens, we have seen the following:

CALIFORNIA. Refugio State Beach, Santa Barbara County, R.E. Orth (6) 15 Oct. 76, (2) 8 Nov. 76, (1) 6 Dec. 76, (14) 17 Jan. 77, (9) 7 Feb. 77, (3) 14 Apr. 77, (65) 17 May 77 (UCR); San Pedro, Los Angeles County, Aug., E.C. Van Dyke (1; CAS); San Pedro, Los Angeles County, E.C. Van Dyke (9; CAS); San Pedro, Los Angeles County, 8-11-03, Blanchard (1; MCZ); San Pedro, Los Angeles County, Aug., Wickham (1; USNM); Torrey Pines, San Diego County, 7 Apr. 34 (1; ERIC); Torrey Pines, San Diego County, 15 Nov. 50, I. Moore (1; ERIC); La Jolla, San Diego County, 22 Nov. 50, I. Moore (1; ERIC); Point Loma, San Diego County, 28 Dec. 28, E.C. Van Dyke (19; CAS); San Diego, San Diego County, F.E. Blaisdell (11; CAS); San Diego, San Diego County, 23 May 27 (1; CAS); Coronado, San Diego County, 7 June 90, F.E. Blaisdell (1; CAS).

MEXICO, BAJA CALIFORNIA NORTE. Rio San Telmo, 16 June 38, Ross & Michelbacher (70; CAS); Socorro Dunes, 17 July 74, R.M. Haradon, V. Lee & W.E. Savary (1; UCR).

4. *Cafius femoralis* (Mäklin)

Figs. 1D, 5D, 7A-B.

Philonthus femoralis Mäklin, 1852, Bull. Soc. Imp. Moscow 25:189.

Cafius femoralis (Mäklin), Horn, 1884, Trans. Amer. Ent. Soc. 11:235, 238; Casey, 1885, Bull. Calif. Acad. Sci. 1:337 Fig. 5 (pt.); Koch, 1936, Publ. Mus. Ent. Pietro Rossi 1:199; Hach, 1957, Univ. Wash. Publ. Biol. 16:210, 355 Pl. 27 Fig. 2 (toto).

Cafius mutatus Gemminger and Harold, 1868, Cat. Coleopt. 2:590.

Description of lectotype.—♂

Length.—5.8 mm.

Color.—Head black, pronotum and abdomen dark brown, elytra slightly paler, femora and tarsi pale brown, tibiae dark brown, mouth parts and base of antenna dark brown, antenna progressively paler toward apex.

Head.—Quadrately, about as long as wide, basal angles broadly rounded; eye more than half as long as tempora; punctures of upper surface small, separated by about their diameters, with a central longitudinal impunctate area along length of head; ground sculpture finely, densely reticulate; undersurface finely and densely punctured and reticulate; gula densely reticulate; antennae distinctly longer than combined lengths of head and pronotum; 10th segment $\frac{1}{10}$ longer than wide (contrary to statements by Horn 1884, pp. 235, 238).

Pronotum.—Longer than wide; apex broadly rounded; widest near broadly rounded apical angles, thence narrowed with sides nearly straight to the somewhat narrowly rounded basal angles; base arcuate; surface with evenly placed dense small punctures except for central longitudinal impunctate area, densely reticulate except for a small tumid area in middle at base.

Elytra.—With suture a little shorter than length of pronotum; surface so finely and densely sculptured that punctures hardly visible.

Abdomen.—With acrocostal suture nearly straight; finely rather densely punctured and reticulate; pubescence fine, longitudinal throughout; undersurface uniformly punctured and pubescent. Apex of 6th sternite with a triangular emargination which is about as wide as deep, the base of which has a membrane with an oval emargination.

This male has a gray disc, a male symbol, a white square reading "177", a red label reading "Type 7330", a large white label reading "*Philonthus femoralis*/Mäklin/Kodiak", a label reading "LeConte/collection", and one reading "Lectotype/*Cafius*

femoralis/Mäklin desg. '78/R.E. Orth, I. Moore." One other specimen, a female, in the LeConte collection has a label reading "*maritimus* Mots. Kodjak" and a "LeConte collection" label.

Type locality.—Kodiak Island, Alaska.

Male characters.—Anterior tarsus broadly dilated. Apical margin of 6th sternite with deep triangular emargination with a membrane at its bottom. Genitalia similar to those of *Cafius luteipennis* males; but paramere with 10 pegs on its inner face rather than 6 as in members of the latter species.

Female characters.—Anterior tarsus almost as broadly dilated as in male. Apical margin of 6th sternite entire.

Variation.—There is little variation among the specimens seen by us.

Notes.—*Cafius femoralis* and *C. opacus* are unique among Pacific coast species in having the 10th antennal segment longer than wide. In *C. opacus* adults, the elytral suture is distinctly shorter than the pronotum, whereas in *C. femoralis* adults, it is fully as long as the pronotum.

The immature stages have not been described.

We have examined 239 specimens.

Distribution.—This species is known from Alaska to Carmel, Monterey County, California. Besides the type specimens, we have seen the following:

ALASKA. Haines, 3 June 68, Campbell & Smetana (30; ERIC); Kodiak (1; MCZ).

BRITISH COLUMBIA. Q[ueen] C[harlotte] I[land], [Keen], (4; ERIC); Masset, Graham Island (1; MCZ); Bowser, 12 June 55, W.J. Brown (25; ERIC); Pacific Rim, N.P. Michigan Cr., 12 July 75, M. & B. A. Campbell (23; ERIC); Metchosin, West Victoria, 29 May 58, Lindroth (1; ERIC); Victoria, Hubbard & Schwarz (1; USNM).

WASHINGTON. Port Angelus, Clallam County, 28 May 07, E.C. Van Dyke (18; CAS).

OREGON. Cannon Beach, Clatsop County, 15 June 27, E.C. Van Dyke (1; CAS).

CALIFORNIA. Bear Harbor, Mendocino County, D. Giuliani (6; ERIC); Needle Rock, Mendocino County, 6 Oct. 74, D. Giuliani (4; UCR); Mouth of Russian River, Sonoma County, Jan. 70, D. Giuliani (1; UCR); Carmel, Monterey County, 4 Feb. 17, L.S. Slevin (1; CAS); Carmel, 28 Mar. 22, (22; CAS); Carmel, 13 Apr. 13, L.S. Slevin (1; CAS); Carmel, 21 May 11, E.C. Van Dyke (1; CAS).

5. *Cafius lithocharinus* (LeConte)

Figs. 2A, 7C-D.

Philonthus lithocharinus LeConte, 1863, Smith. Misc. Coll. VI, No. 140:38.

Cafius lithocharinus (LeConte), Horn, 1884, Trans. Amer. Ent. Soc. 11:23, 236; Koch, 1936, Publ. Mus. Ent. Pietro Rossi 1:193; Hatch, 1957, Univ. Wash. Publ. Biol. 16:210, 235 Pl. 27 Fig. 2 (toto); James, Moore and Legner, 1971, Trans. San Diego Soc. Nat. Hist. 16:282 (larva), 288 (pupa); Leech and Moore, 1971, Wasmann Jour. Biol. 29:66 (ecology); Moore, 1975, Pan-Pac. Ent. 51:140 (larva); Orth, Moore and Fisher, 1978, Wasmann Jour. Biol. 35:175, Fig. 6 (toto), 182, 183, 186 (ecology).

Description of lectotype.—♂

Color.—Largely piceous with, near inner apical angle of each elytron, a buff to reddish-brown nearly circular spot extended to apical margin but not to suture. Sixth and 7th visible tergites and cerci reddish-brown; 4th sternite with a small reddish-brown area on each side near base and a similar transverse band near apical margin, 5th sternite largely reddish-brown with lateral and apical margins piceous, 6th and 7th sternites reddish-brown. Elytral epipleura buff colored. Legs reddish-brown.

Head.—Quadrate, slightly wider than long, lateral basal angles broadly rounded; eye ½ length of tempora; punctures of upper surface large, umbilicate, largely separated by about their diameters, somewhat more crowded at base; with an impunctate area adjacent to clypeal margin connected narrowly with a broad central impunctate area; ground sculpture finely, densely reticulate throughout; undersurface roughly sculptured with

large coarse coalescent punctures arranged in diagonal rows; gula densely and finely reticulate; antenna slightly shorter than combined lengths of head and pronotum, 10th segment slightly wider than long.

Pronotum.—About as wide as long; apex broadly rounded; widest near broadly rounded apical angles, thence narrowed with lateral margins slightly concave to the broadly rounded basal angles; base arcuate; surface with simple punctures separated by less than their diameters, somewhat smaller and more crowded than those of head; central impunctate area clearly defined; not elevated except very slightly in a small area near base; surface densely reticulate and dull throughout except for small, somewhat shiny basal area.

Elytra.—With suture slightly shorter than length of pronotum; each elytron $\frac{3}{4}$ as long as sutural length; surface very finely, uniformly densely, somewhat roughly punctured; finely reticulate between punctures.

Abdomen.—Finely and more sparsely punctured than elytra; finely reticulate between punctures. Acrostal sutures straight. Pubescence fine, longitudinal throughout. Undersurface uniformly punctured and pubescent throughout.

This large male in the LeConte collection at MCZ has the left antenna missing beyond the 3rd segment. Below the specimen, a gold disc (California) and a small σ symbol are attached. We have added a label reading "Lectotype/*Cafius lithocharinus*/LeConte desig. '78/R.E. Orth, I. Moore."

Type locality.—San Diego, California.

Besides the lectotype, there are 2 males and 1 female in the LeConte collection bearing gold discs. One of the males has a white label reading "*P. lithocharinus* LeC. S.D." and a red label reading "Type 6288." The LeConte collection also includes 2 males and 3 females labeled "Cal" and 1 female labeled "Cal" with a conspicuous ink dot under the C. These last 6 specimens may not be part of the original type series.

Male characters.—First 4 segments of anterior tarsus broadly dilated. Apical margin of 6th sternite with triangular emargination about as deep as wide, emargination partly filled by membrane with an oval emargination. Genitalia most similar to those of *C. femoralis* males. However, aedeagus not as strongly tapered at apex and paramere somewhat longer in relation to aedeagus than in *C. femoralis* males.

Female characters.—Head about as wide as pronotum, anterior tarsus almost as broadly dilated as in male and 6th sternite simple.

Variation.—Color, particularly that of the elytra, is variable. Rarely is the disc of the elytra entirely piceous. The buff colored spot may be variously enlarged or may extend across the entire apex of the elytra, or, in few specimens, even forward to cover the entire elytron. In the latter case, the specimen will resemble *Cafius luteipennis* adults; but the elytra have a more reddish cast compared with the yellowish cast of *C. luteipennis* adult elytra. The legs and abdomen are variably darker in some specimens. Size of the head and pronotum of males varies considerably. In some males, such as the lectotype, the head is much wider than the pronotum, in which case, the pronotum is also wider than usual, about as wide as long. In other males, the head is variably narrow until it may be no wider than pronotum in which case the pronotum is longer than wide. In females, the head is always about as wide as the pronotum, which is longer than wide. In some females, the punctures on the undersurface of the head are not strongly coalescent.

Notes.—Most specimens of *Cafius lithocharinus* can be recognized by the pale apical margin of the elytra; but, as mentioned above, some individuals have the elytra entirely piceous or entirely pale. The sculpture of the undersurface of the head readily distinguishes members of this species from all other Pacific coast species; the punctures are very large, deeply impressed and crowded in diagonally arranged short rows of coalescing punctures. The sculpture of the undersurface of the head is coarse and rough.

The larvae, pupae and ecology were described by James et al. (1971).

We have examined 5506 specimens.

Distribution.—This species is known from British Columbia to Cedros Island, Baja California del Norte, Mexico. According to Orth et al. (1978), adults were abundant in wrack at Refugio State Beach, Santa Barbara County, California, from September

through March but not from April to August. They said, "It is known to fly in swarms along the beach in winter probably on dispersal flights (Leech and Moore 1971); and at such times can be found under almost every bit of debris on the beach. Flights look deceptively like swarms of flies." Besides the type series, we have seen the following specimens:

BRITISH COLUMBIA. Pacific Rim, Klanawa River, 14 July 75, J.M. & B.A. Campbell (117; ERIC).

WASHINGTON. 2 mi. n. La Push, Clallam County, 17 Oct. 74, D. Giuliani (1; UCR); Kaloloch, 3 Sept. 34, A.L. Melander (1; MCZ).

CALIFORNIA. Sonoma, Sonoma County, June 27, Ricksecker (1; FMNH); many spms., many localities from Marin County to San Diego County, mostly from Sep. to May.

MEXICO, BAJA CALIFORNIA NORTE. Rosarito Beach, 27 May 50, I. Moore (34; ERIC); Descanso Bay, 29 May 50, I. Moore (1; ERIC); La Misión de San Miguel, 27 May 50, I. Moore (3; ERIC); La Salina, var. dates June-Aug. 71, I. Moore (35; UCR); Ensenada, 16 Aug. 50, I. Moore (1; ERIC); Rio San Telmo, 15 June 38, Ross & Michelbacher (1; CAS); Camalú Point, San Ramón Bay, 19 June 39, Harbison & Bildebeck (2; UCR); Colonia Guerrero, 28 May 50, I. Moore (15; ERIC); 15 m. n. Rosario, 1 Aug. 38, Ross & Michelbacher (14; CAS); Estero Rosario, 25 Apr. 68, P. Arnaud (95; CAS); n. end Cedros Island, 27 Mar. 53, J. Figg-Hoblyn (1; ERIC).

6. *Cafius luteipennis* Horn

Figs. 2B, 7E-F

Cafius luteipennis Horn, 1884, Trans. Amer. Ent. Soc. 11:235, 237; Koch, 1936, Publ. Mus. Ent. Pietro Rossi, 1:191; Hatch, 1957, Univ. Wash. Publ. Biol. 16:211, 355 Pl. 27 Fig. 3 (toto); James, Moore and Legner, 1971, Trans. San Diego Soc. Nat. Hist. 16:282 (larva), 284 Fig. 3 (larva), 287 Fig. 7 (pupa); Moore, 1975, Pan-Pac. Ent. 51:140 (larva); Orth, Moore and Fisher, 1978, Wasmann Jour. Biol. 35:175 Fig. 7 (toto), 182, 183, 186 (ecology).

Description of lectotype.—♂

Color.—Piceus with elytra bright buff.

Head.—Quadrately, about as wide as long, lateral basal angles broadly rounded; eye about $\frac{3}{4}$ as long as tempora; punctures large umbilicate, mostly separated by their diameters or less; disc with a small irregularly defined impunctate area; reticulate between punctures; undersurface with large evenly spaced weakly impressed punctures throughout; antennae almost as long as combined lengths of head and pronotum, 10th segment a little wider than long.

Pronotum.—Somewhat longer than wide; apex nearly straight, widest near broadly rounded apical angles, thence narrowed with lateral margin very slightly concave to broadly rounded basal angles; base arcuate; surface with simple punctures mostly spaced about as on head, with a broad central longitudinal impunctate area and a small irregularly shaped impunctate area on each side near the apex adjacent to line of punctures which delimits the central impunctate space; surface densely reticulate throughout.

Elytra.—With suture shorter than length of pronotum; each elytron $\frac{1}{2}$ as wide as sutural length; surface finely, densely punctured, reticulate between punctures.

Abdomen.—With acrocostal sutures straight; finely and more sparsely punctured than elytra, finely reticulate; pubescence fine, longitudinal throughout. Sternites uniformly punctured and pubescent.

This male from the Horn collection in MCZ bears the following labels: "Cal", "Horn coll/H2261" and "Lectotype/*Cafius luteipennis*/Horn desig. '78/R.E. Orth, 1. Moore."

Besides the lectotype, there are 9 specimens with the same data as the lectotype in the Horn collection, 1 of which also bears a label reading "*Ph. luteipennis* LeC." (Sic!). The LeConte collection also contains the following specimens: 1 female with labels reading "Cal" underlined in red ink, a red label reading "Type/7329" and a "*C. luteipennis* J.

LeC." (Sic!) label; a male with a "Cal" label with an ink dot under the C; a female with a "Cala." label and a female with a "Cal" label underlined with red ink.

Male characters.—First 4 segments of anterior tarsus broadly dilated. Apical margin of 6th sternite with a shallow oval emargination with a membranous border. Aedeagus most similar to that of *C. femoralis* males, but differs particularly in having only 6 pegs at inner apex of paramere instead of 10 as in the latter.

Female characters.—Anterior tarsus about as broadly dilated as in male. Apical margin of 6th sternite entire.

Variation.—There appears to be very little variation among the specimens examined. A few males have the head a little larger than that of females.

Notes.—Adults of this species are easily recognized among Pacific coast *Cafius* by their bright buff colored elytra. A few specimens of *C. lithocharinus* have clear, bright golden elytra; but in these, the punctures on the underside of the head are large and coalescent in diagonal rows. In *C. luteipennis* adults, the punctures of the undersurface of the head are always discrete.

Description of larvae and pupae and notes on ecology were provided by James et al. (1971).

We have examined 885 specimens.

Distribution.—This species is known from British Columbia, Canada, to El Tomatal, Baja California del Norte, Mexico; but undoubtedly it will eventually be found to extend farther south along the unexplored coast of Baja California. Orth et al. (1978) reported it from Refugio State Beach, Santa Barbara County, California, as most abundant from September through May. Besides the type specimens, we have seen the following:

BRITISH COLUMBIA. Masset, Graham Island, 1918, Mrs. Clark (1; MCZ); Q[ueen] C[harlotte] I[slands], [Keen] (7; ERIC); Miracle Beach, Vancouver Island, 22 Aug. 75, J.M. & B.A. Campbell (3; ERIC); Parkville, 23 Nov. 38, H. Andison (2; ERIC); Victoria, Coquillet (3; USNM).

WASHINGTON. 2 mi. n. La Push, Clallam County, 17 Oct. 74, D. Giuliani (1; UCR).

OREGON. Whitehead Beach, Curry County, 6 July 74, A. Newton & M. Thayer (2; MCZ).

CALIFORNIA. Haversneck, Mendocino County, D. Giuliani (1; ERIC); Mouth of Russian River, 4 July 08, Van Dyke (1; ERIC); Avalon, Santa Catalina Island, Los Angeles County, KWH (1; USNM); many specimens, many localities between Marin and San Diego counties, mostly from October to April.

MEXICO, BAJA CALIFORNIA NORTE. Descanso Bay, 27 May 50, I. Moore (3; ERIC); La Salina, 22 July 71, I. Moore (2; UCR); Colonia Guerrero, 16 Aug. 50, I. Moore (4; ERIC); Socorro Dunes, 17 July 74, R.M. Haradon, V. Lee and W.E. Savary (1; UCR); Rosario, 1 Aug. 38, Ross & Michelbacher (2; CAS); Arroyo Rosario, 25 Apr. 63, P. Arnaud (3; CAS); El Tomatal, 18 July 74, R.M. Haradon, V. Lee and W.E. Savary (5; UCR).

7. *Cafius decipiens* (LeConte)

Figs. 2C, 7G-H.

Philonthus decipiens LeConte, 1863, Smith. Misc. Coll. VI, No. 140:40.

Cafius decipiens (LeConte), Horn, 1884, Trans. Amer. Ent. Soc. 11:235, 239; Koch, 1936, Publ. Mus. Ent. Pietro Rossi, 1:190.

Description of lectotype.—♂

Length.—7.7 mm.

Color.—Head dark reddish brown, remainder of body and appendages a paler uniform reddish brown.

Head.—Square, slightly wider than long, basal angles broadly rounded; eye $\frac{1}{2}$ length of tempora; punctures of upper surface moderate sized, not conspicuously umbili-

cate, separated mostly by about their own diameters; with a central impunctate area extending from clypeal margin to near base; ground sculpture densely reticulate throughout; undersurface with punctures and ground sculpture very much like that above; gula densely reticulate; antennae a little longer than combined lengths of head and pronotum; 10th segment slightly wider than long.

Pronotum.—Somewhat longer than wide; apex broadly rounded, widest near broadly rounded apical angles, thence narrowed and straight to broadly rounded basal angles; base arcuate; surface with simple punctures about same size as those of head, separated by about their own diameters; central impunctate area clearly defined and hardly elevated except for a small basal tumid area; surface densely reticulate and dull throughout.

Elytra.—With suture about $\frac{1}{3}$ shorter than pronotum; each elytron $\frac{3}{4}$ as wide as sutural length; surface very finely densely sculptured, punctures hardly distinguishable.

Abdomen.—Finely, rather sparsely punctured and finely reticulate, with acrocostal suture straight. Pubescence fine, longitudinal throughout.

This male in the LeConte collection at MCZ bears a gold disc (California) and a small σ symbol. Beneath this is a plastic capsule containing the genitalia in glycerine. We have attached a label reading "*Lectotype* desig. *Cafius decipiens*/LeConte 1978, Orth and Moore."

Type locality.—San Diego, California.

Besides the lectotype, 1 male (with sex symbol attached) and 1 female, both with gold discs are in the LeConte collection. The female also has a white label reading "*P. decipiens* LeC. S.D." and a red label reading "Type 6290." There are also 1 male and 3 females, each with a white label reading "Cal.", the male also with a small sex symbol. These last 5 specimens may not be part of the original type series.

Male characters.—First 4 segments of anterior tarsus somewhat broadly dilated. Apical margin of 6th sternite with a broad deep oval emargination surrounded by a fairly wide membranous border. Genitalia most similar to those of *Cafius sulcicollis* males, but aedeagus strongly constricted in apical third, then abruptly widened, resembling shoulders. In *C. sulcicollis* males, aedeagus slipper-shaped, without a trace of shoulders at apical third.

Female characters.—First 4 segments of anterior tarsus about as broadly dilated as in male. Apical margin of 6th sternite entire.

Variation.—The specimens seen by us show little variation.

Notes.—Members of this species closely resemble those of *C. sulcicollis* but can be distinguished by their reddish-brown head, which is black in *C. sulcicollis* adults. The eye is almost exactly $\frac{1}{2}$ the length of the tempora whereas in *C. sulciocollis* adults the eye is noticeably longer than $\frac{1}{2}$ the length of the tempora. Males of this species differ strikingly from those of the other Pacific coast *Cafius* species in the shape of the aedeagus, which is strongly constricted in its apical third. Male genitalia are relatively larger than those of the other Pacific coast species.

Nothing is known of the life history or ecology of this species.

We have seen 34 specimens.

Distribution.—This species is known from San Pedro, Los Angeles County, California, to 24 kilometres north of Rosario, Baja California Norte, Mexico. The single specimen listed below from Mexico is the only one with a collection date. All California specimens were probably collected near or before the turn of the century. Besides the type series we have seen the following specimens:

CALIFORNIA. Cal., F.A. Eddy (2; MCZ); Cal., Hubbard & Schwarz (3; USNM); San Pedro, Los Angeles County, July, A. Fenyes (2; CAS); San Pedro, Los Angeles County, Aug., A. Fenyes (1; CAS); San Diego County, F.E. Blaisdell (1; CAS); San Diego, San Diego County (1; MCZ); [San Diego Bay, Spring], T.L. Casey (see Casey 1885:312) (10; USNM); San Diego, Hubbard & Schwarz (5; USNM).

MEXICO, BAJA CALIFORNIA NORTE. 15 mi. n. Rosario, 1 Aug. 38, Ross & Michelbacher (1; CAS).

8. *Cafius sulcicollis* (LeConte)

Figs. 2D, 8A-B.

Philonthus sulcicollis LeConte, 1863, Smith. Misc. Coll. VI, No. 140:40.*Cafius sulcicollis* (LeConte), Horn, 1884, Trans. Amer. Ent. Soc. 11:235, 237; Koch, 1936, Publ. Mus. Ent. Pietro Rossi, 1:191; Leech and Moore, 1971, Wasmann Jour. Biol. 29:65 (ecology); Orth, Moore and Fisher, 1978, Wasmann Jour. Biol. 35:176 Fig. 9 (toto), 182, 187 (ecology).*Description of lectotype.*—♂*Length.*—5.8 mm.*Color.*—Head and metasternum black, remainder of body and appendages reddish-brown.*Head.*—Quadrate, slightly wider than long, lateral basal angles broadly rounded; eye distinctly more than $\frac{1}{2}$ as long as tempora; puncturation of upper surface just discernably umbilicate, most punctures separated by about their own diameters, slightly more crowded at base, with an impunctate area adjacent to clypeal margin and a small impunctate central area; ground sculpture densely reticulate throughout; undersurface with puncturation and ground sculpture very similar to that above; gula densely, finely reticulate; antenna very slightly shorter than combined lengths of head and pronotum; 10th segment slightly wider than long.*Pronotum.*—Distinctly longer than wide, apex arcuate, widest near broadly rounded apical angles, sides slightly concave before broadly rounded basal angles, base arcuate; surface with simple punctures evenly placed, about same size as those of head; central impunctate area somewhat irregularly defined by punctures but demarked on each side by a shallow sulcus; surface densely reticulate throughout except for a very small shining area in middle near base.*Elytra.*—With suture as long as pronotum; each elytron about $\frac{3}{4}$ as wide as sutural length. Surface very finely, densely, and asperately punctured.*Abdomen.*—Finely, sparsely punctured, finely reticulate between punctures, with acrocostal suture straight. Pubescence fine, longitudinal throughout.This male in the LeConte collection at MCZ has beneath it a gold disc (California) and a small ♂ symbol. Below this is a plastic capsule containing the genitalia in glycerine and a label reading "Lectotype/*Cafius sulcicollis*/LeConte desig. '78/R.E. Orth, I. Moore."*Type locality.*—San Diego, California.Besides the lectotype, there are 3 females with gold discs in the LeConte collection, one of which also bears a white label reading "*P. sulcicollis* LeC., S.D.", and a red label reading "Type 6289." One male in the LeConte collection, but possibly not part of the original type series, has a white label reading, "Cal." underlined in red ink; and another male has a "Cal." label with a distinct ink dot below the C.*Male characters.*—First 4 segments of anterior tarsus broadly dilated. Apical margin of 6th sternite with an oval emargination, about as deep as wide and nearly filled with membrane. Genitalia most similar to those of *C. luteipennis* males. They differ most noticeably from the latter in that the middle tumescence is distinctly closer to the basal attachment of the paramere than to the apex of the paramere; whereas, in the latter it is very nearly centrally placed.*Female characters.*—First 4 segments of anterior tarsus are about as broadly dilated as in male and apical margin of 6th sternite entire.*Variation.*—Very little variation has been detected.*Notes.*—Adults of this species are easily distinguished from those of other Pacific coast *Cafius* species except *C. decipiens* by the combination of the transverse 10th antennomere, the longitudinal abdominal pubescence, the simple puncturation of the undersurface of the head and the uniformly punctured sides of the pronotum. They differ from *C. decipiens* adults in having a black head and longer eye. The eye is more than $\frac{1}{2}$ the length of the tempora. In *C. decipiens* adults, the head is reddish-brown and the eye is almost exactly $\frac{1}{2}$ as long as the tempora.

The immature stages have not been described. Larva described as belonging to this species and records of this species from the Salton Sea, Imperial County, California, and Sonora, Mexico, by Moore (1974, 1975) and Moore and Legner (1973) actually represent *Cafius bistriatus* (Erichson).

We have examined 213 specimens.

Distribution.—This species has been reported from Refugio State Beach, Santa Barbara County, California (Orth et al. 1978) to Magdalena Island, Baja California Sur, Mexico (Horn 1894). The Magdalena Island specimen has not been seen by us. There is a single female in the collection of the University of California, Riverside, which we doubtfully place here, collected by Derham Giuliani 3.2 kilometres north of La Puch, Clallam County, Washington, 17 October 1974. Orth et al. (1978) reported this as the least abundant of the *Cafius* species found at Refugio State Beach, Santa Barbara County, California, but only slightly less so than *C. opacus*. Furthermore, it is a winter species found chiefly from October to May. Leech and Moore (1971) reported adults in flight on the beach in Baja California and San Diego, California.

Besides the type series we have seen the following specimens:

CALIFORNIA. Gaviota, Santa Barbara County, 20 Sept. 50, 1. Moore (1; ERIC); Refugio State Beach, Santa Barbara County, R.E. Orth, (4) 8 Nov. 76, (9) 6 Dec. 76, (5) 17 Jan. 77, (6) 7 Feb. 77, (2) 14 Mar. 77, (4) 12 Apr. 77. (1) 17 May 77, (1) 2 Aug. 77, (1) 8 Sept. 77 (UCR); Frazier Point, Santa Cruz Island, 8 Jan. 71, J. Pinto, Chearey, R. Somerby (1; UCR); Santa Barbara, Santa Barbara County, June, A. Fenyes (1; CAS); Redondo, Los Angeles County, Apr., A. Fenyes (1; CAS); Redondo, Los Angeles County, July, A. Fenyes (1; CAS); San Pedro, Los Angeles County, Aug., A. Fenyes (2; CAS); San Pedro, Los Angeles County (1; FMNH); Los Angeles, Los Angeles County, Coquillett (1; USNM); Laguna Beach, Orange County, Baker (1; FMNH); Cardiff, San Diego County, 21 Aug. 71, G. Olton & I. Moore (1; UCR); Torrey Pines, San Diego County, 22 May 55, I. Moore (1; UCR); La Jolla, San Diego County, 11 Apr. 34, I. Moore (1; CAS); La Jolla, 22 Apr. 51, I. Moore (30; ERIC); La Jolla, 29 Aug. 50, I. Moore (29; ERIC); La Jolla, 22 Sept. 53, I. Moore (2; ERIC); La Jolla, 22 Oct. 50, I. Moore (1; ERIC); La Jolla, 22 Nov. 50, I. Moore (84; ERIC); Sunset Cliffs, San Diego County, 23 Aug. 50, I. Moore (1; ERIC); Sunset Cliffs, San Diego County, 5 Oct. 53, I. Moore (1; ERIC); Ocean Beach, San Diego County, 2 Sept. 50, I. Moore (3; ERIC); Mission Bay, San Diego County, 25 Sept. 53, I. Moore (1; ERIC); San Diego Bay, San Diego County, 2 Sept. 50, I. Moore (26; ERIC); Point Loma, San Diego County, 28 Dec. 28, E.C. Van Dyke (1; ERIC); San Diego, San Diego County, May, A. Fenyes (1; ERIC); San Diego, A. Watson (1; ERIC); North Island, San Diego County, 2 Mar. 30, I. Moore (1; ERIC); North Island, San Diego County, 6 Apr. 38, I. Moore (1; ERIC).

MEXICO, BAJA CALIFORNIA NORTE. Colonia Guerrero, 28 May 50, I. Moore (10; ERIC); 15 mi. n. Rosario, 1 Aug. 35, Ross & Michelbacher (1; CAS); Arroyo Rosario, 25 Apr. 63, P. Arnaud, (1; CAS).

9. *Cafius bistriatus* (Erichson)

Figs. 3A, 5E, 8C-D, 10

Philonthus bistriatus Erichson, 1840, Gen. Spec. Staph. 502.

Philonthus bilineatus Erichson, 1840, Gen. Spec. Staph. 503.

Cafius bistriatus (Erichson), Horn, 1884, Trans. Amer. Ent. Soc. 11:235, 237; Koch, 1936, Publ. Mus. Ent. Pietro Rossi, 1:175, 187; Blackwelder, 1943, Bull. U.S. Nat. Mus. 182:436, 438.

Cafius bilineatus (Erichson), Koch, 1936, Publ. Mus. Ent. Pietro Rossi 1:176, 187.

Cafius sulcicollis (LeConte), Moore, 1975, Pan-Pac. Ent. 51:140 (larva), Fig. 1-4 (larva), 142 (larva).

Description of male.—From El Desemboque, Sonora, Mexico.

Length.—6.5 mm.

Color.—Head black, remainder of body dark reddish-brown with antenna gradually paler to apex.

Head.—Quadrated, about as wide as long, lateral basal angles broadly rounded; eye distinctly shorter than tempora; punctures of upper surface moderate-sized, umbilicate, separated by more than their own diameters, with an irregular impunctate central area the length of head; surface densely reticulate at sides, weakly so in very center of disc; under-surface uniformly punctured with ground sculpture very similar to that above; gula densely reticulate; antennae a little shorter than combined lengths of head and pronotum, 10th segment slightly wider than long.

Pronotum.—Longer than wide, apex broadly rounded, widest near broadly rounded apical angles, thence narrowed and nearly straight to the broadly rounded basal angles, base arcuate; surface with a broad longitudinal impunctate area bounded on each side by a row of 16 or 17 large equidistant punctures, and with a narrow irregular impunctate area lateral to same almost as long as pronotum; sides somewhat evenly punctured to lateral margin; surface reticulate at sides, reticulation becoming very feeble in central impunctate area.

Elytra.—With suture slightly longer than pronotum; each elytron $\frac{2}{3}$ as wide as sutural length; surface distinctly and very densely punctured, punctures separated by less than their own diameter, very finely reticulate between punctures.

Abdomen.—Almost as densely punctured as elytra, punctures asperate; acrocostal sutures straight; without ground sculpture; pubescence fine, longitudinal throughout. Undersurface uniformly punctured and pubescent throughout.

Type locality.—Long Island, New York.

Male characters.—Anterior tarsus broadly dilated. Apical margin of 6th sternite with a shallow triangular emargination partly filled by membrane. Genitalia most similar to those of *Cafius sulcicollis* males; but aedeagus more pointed at apex, and paramere relatively shorter. Middle tumescence of aedeagus located very near to middle of paramere, rather than at about the basal $\frac{1}{3}$ of the paramere as in *C. sulcicollis* males.

Female characters.—Anterior tarsus almost as broadly dilated as in male. Apical margin of 6th sternite entire.

Variation.—In some males, the head is slightly larger than in the females. Most west coast specimens have the tibiae a little darker than the femora and tarsi. The color of west coast specimens is otherwise fairly consistent except for an occasional specimen which is slightly darker.

Notes.—Adults of this species closely resemble those of *Cafius sulcicollis* and were reported as that species from the Salton Sea by Moore and Legner (1973) and from Sonora, Mexico, by Moore (1974). Western specimens differ from *C. sulcicollis* specimens in the shining surface with weak or absent reticulation of the central impunctate area of the pronotum; that area in *C. sulcicollis* adults is as strongly reticulate as the sides of the pronotum and the head. In all *C. bistriatus* specimens from western North America, there is always a prominent shiny impunctate area just lateral to the row of punctures which delimit the central impunctate area of the pronotum; such an area is rarely present in *C. sulcicollis* specimens, and when present it is dull due to strong reticulation. The punctures of the elytra in *C. bistriatus* adults are distinctly separated and not asperate, whereas in *C. sulcicollis* members they are asperate and tend to run together in weak lateral ridges so that the individual punctures are not easily seen. The color of western specimens of *C. bistriatus*, except for the black head, is usually bright reddish-brown, whereas *C. sulcicollis* members are usually dark brown.

The aedeagus of *Cafius bistriatus* is more pointed at the apex than that of *C. sulcicollis*; and the paramere is relatively shorter.

The larva was described by Moore (1975) as that of *C. sulcicollis*.

We have examined 480 specimens from western North America and 740 specimens from eastern North America.

Distribution.—This species was originally described from Long Island, New York, and has been recorded from various localities along the eastern seashore of the United States from Massachusetts to Florida, numerous localities in the West Indies and from

South America. We present here a first record from the west coast of North America. In that area, it is known from Desert Beach, Salton Sea, Riverside County, California, through almost the entire Gulf of California to Isla San José, Baja California Sur, near LaPaz, and from 63 kilometres north of Guerrero Negro, Baja California Norte on the Pacific coast of Baja California. We have seen the following specimens from western North America:

CALIFORNIA. Desert Beach, Salton Sea, Riverside County, 3 Mar. 68, K. Cooper (3; UCR).

MEXICO, SONORA. Punta Peñasco, 7 June 74, algae covered rock with small barnacles, V. Roth (1; ERIC); Punta Cirio, 29.50-112.40, wrack on sandy beach, V. Roth & W. Brown (99; UCR); near Punta Cirio, 28 Aug. 74, V. Roth & W. Brown (88; UCR); El Desemboque de Los Seris, 1 June 74, W. Brown (5; UCR); Tepoca, 29.18-112.20, wrack on sandy beach, V. Roth & W. Brown (2; UCR); Punta Chueca, 29.00-112.05, light trap on sandy beach, 18 Jan. 75, V. Roth (3; UCR); Punta Doble, 26 Feb. 74, P. DeBach & M. Rose (1; UCR); Huatabampo, D. Giuliani (1; UCR).

MEXICO, BAJA CALIFORNIA NORTE. 39 mi. n. Guerrero Negro on road to Miller's Landing, 8 Aug. 74, R. Haradon, V. Lee & E. Savary (6; UCR).

MEXICO, BAJA CALIFORNIA SUR. Santa Rosalia, 20 July 74, R.H. Haradon, V. Lee & E. Savary (1; UCR); Isla San José, 19 Apr. 72, rotting fish, L. Cheng (2; UCR).

10. *Cafius caribbeanus* Bierig

Figs. 3B, 8E-F.

Cafius corallicola var. *caribbeanus* Bierig, 1934, Revista Ent. 4:67, 68; Koch, 1936, Publ. Mus. Ent. Pietro Rossi 1:175, 176, 186.

Cafius caribbeanus Bierig, Blackwelder, 1943, Bull. U.S. Nat. Mus. 182:436, 437.

Description of male.—From San Blas, Nayarit, Mexico.

Length.—5.0 mm.

Color.—Head and pronotum black, elytra piceus, abdomen dark reddish-brown, legs and trophi paler than abdomen, antenna gradually paler toward apex.

Head.—Quadrate, almost as wide as long, basal angles moderately broadly rounded; eyes as long as tempora; punctures of upper surface coarse, separated at sides by about their own diameters, with a small impunctate discal area, and a central linear longitudinal impression in apical half; surface sculpture of fine wavy, lines in a dactylographic pattern; undersurface with punctures and surface sculpture similar to that above; gula sculptured with fine wavy dactylographic lines; antenna as long as combined lengths of head and pronotum, 10th segment about as long as wide.

Pronotum.—Longer than wide, apex arcuate, widest near broadly rounded apical angles, thence narrowed and nearly straight to broadly rounded basal angles, base arcuate; surface with a broad longitudinal central impunctate area bounded on each side by a row of 16 or 17 large equidistant punctures, with a narrow, irregular, impunctate area next to same almost as long as the pronotum; sides somewhat evenly punctured to lateral margin; surface with a feeble dactylographic pattern of wavy lines.

Elytra.—With suture slightly shorter than pronotum; each elytron about $\frac{2}{3}$ as wide as sutural length; surface very densely and roughly punctured.

Abdomen.—Almost as densely but somewhat more finely punctured than elytra; acrocostal suture straight; pubescence fine, longitudinal throughout. Undersurface finely, densely punctured.

Male characters.—First 4 segments of anterior tarsus dilated. Apical margin of 6th sternite with an oval emargination about as deep as wide. Aedeagus most similar to that of *C. luteipennis* male, but with apex of median lobe more blunt and somewhat bulbous.

Female characters.—Anterior tarsus almost as broadly dilated as in male. Apical margin of 6th sternite entire.

Notes.—Adults of this species are smaller and darker than western specimens of *Cafius bistriatus* (Erichson). They differ from members of all other North American

Cafius species in that the ground sculpture of the head and pronotum consists of fine wavy lines in a dactylographic pattern. This condition is most apparent on the gula. In adults of most other North American species the gula is so densely reticulate that it has a granular appearance.

We have seen 2 specimens from western North America and 21 specimens from eastern North America.

Distribution.—This species was originally described from the West Indies. We have seen 1 male and 1 female from San Blas, Nayarit, Mexico, September 17-20, 1953, B. Malkin collector in the collection of the California Academy of Sciences. This is the first record of this species from the west coast of North America.

THE SPECIES OF *CAFIUS* OF EASTERN NORTH AMERICA

We have not been able to treat the species of *Cafius* of eastern North America (including the West Indies) as exhaustively as those of western North America. Type specimens of most of them have not been studied. However, dissections have been made of the genitalia of what we believe to be authentically identified specimens.

On the basis of our studies, we have decided that the European species *Cafius sericeus* Holme has not yet been validly recorded from North America. The species which has gone under that name should be called *C. aguayoi* Bierig. *Cafius aguayoi* was synonymized with *C. sericeus* by Blackwelder, 1943. We believe *C. rufifrons* Bierig to be a valid species, not a synonym of *C. bistrriatus* (Erichson) as suggested by Blackwelder, 1943. Other changes may be necessary, but we lack material on which to base these decisions. These possibilities are discussed under the notes on some of the following species.

Key for identification of *Cafius* of eastern North America

- A. Head reddish-brown 1. *C. rufifrons* Bierig
- AA. Head black or piceous.
 - B. Ground sculpture of gula granulose 2. *C. bistrriatus* (Erichson)
 - BB. Ground sculpture of gula fine wavy lines.
 - C. Ground sculpture of head and pronotum fine wavy lines . . . 3. *C. caribeanus* Bierig
 - CC. Ground sculpture of head and pronotum finely granulose.
 - D. Larger species (length of head, pronotum and elytra 2.2-2.8 mm) Atlantic coast of the United States 4. *C. aguayoi* Bierig
 - DD. Smaller species (length of head, pronotum and elytra 1.8-2.2 mm) West Indies 5. *C. subtilis* Cameron

1. *Cafius rufifrons* Bierig

Figs. 3C, 8G-H.

Cafius rufifrons Bierig, 1934, Revista Ent. 4:67-68; Koch, 1936, Publ. Mus. Ent. Pietro Rossi, 1:176, 187; Blackwelder, 1943, Bull. U.S. Nat. Mus. 182:438.

This species was synonymized with *Cafius bistrriatus* (Erichson) by Blackwelder, 1943; but we believe it to be distinct. Adults differ from those of other east coast *Cafius* species in its reddish-brown head. Although it is otherwise similar to *C. bistrriatus*, the aedeagus is not as abruptly narrowed towards the apex as in males of that species.

A single specimen in the United States National Museum is labeled "Miami, VI-36, A. Bierig Coll., Fla./USA, Paratype No. 52746 USNM." This cannot be a paratype because the original description was in 1934, 2 years earlier than the specimen was collected.

We have examined 20 specimens.

2. *Cafius bistriatus* (Erichson)
Figs. 3A, 5E, 8C-D, 10.

This species is recorded in this paper for the first time from the west coast of North America. Full citations, descriptions and notes are given in that section of this paper.

Considerable variation exists in the ground sculpture in specimens from the extremes of range in eastern North America. However, only minor differences have been found in the male genitalia and these appear to intergrade between the extremes of range. Long series of specimens from Long Island Sound and from Chesapeake Bay consistently have the head and pronotum with dense reticulate ground sculpture; whereas, in specimens from the West Indies and western North America, those parts are weakly reticulate with occasional smooth polished areas. Some specimens from the southeastern United States are intermediate. We lack extensive material from the intermediate region. For the present, it appears best to leave the synonymy as given. If the 2 forms are determined to be separate species, the name *C. bistriatus* (Erichson) will apply to specimens from north-eastern United States and *C. bilineatus* (Erichson) to the southern and western form.

Most specimens from the West Indies and western North America were collected from open sandy beaches, whereas those from Long Island and Chesapeake Bay were found under sea lettuce (*Ulva*) on the shores of protected waters.

3. *Cafius caribeanus* Bierig
Figs. 3B, 8E-F.

This species is recorded in this paper for the first time from the west coast of Mexico. Full citations, description and notes are given in that section of this paper.

It has previously been known only from the West Indies. It is unusual in that the ground sculpture of the adult head and pronotum is in the form of fine wavy lines in a dactylographic pattern. In males of this species, the aedeagus is bulbous at the apex and the paramere is relatively longer than in males of other eastern species.

We have examined 21 specimens from the West Indies.

4. *Cafius aguayoi* Bierig
Figs. 3D, 9A-B.

Cafius sericeus (Holme), Horn, 1884, Trans. Amer. Ent. Soc. 11:235, 238 (not Holme, 1837).

Cafius aguayoi Bierig, 1934, Revista Ent. 4:66; Koch, 1936, Publ. Mus. Ent. Pietro Rossi 1:192.

This is a common species along the eastern seashore of the United States. It has been listed as *Cafius sericeus* Holme, a European species which is very similar in appearance. However, the male genitalia differ sufficiently for us to determine that they represent distinct species. The paramere is distinctly more slender than in males of the European *C. sericeus* Holme (Figs. 9E-F). Specimens of *C. aguayoi* Bierig appear not to differ from those of other east coast specimens, so we apply that name to this species. It is known only from the east coast of the United States.

We have seen 463 specimens.

5. *Cafius subtilis* Cameron
Figs. 4, 9C-D.

Cafius subtilis Cameron, 1922, Ann. Mag. Nat. Hist., Ser. 9, 9:121; Blackwelder, 1943, Bull. U.S. Nat. Mus. 182:436.

Cafius sericeus var. *subtilis* (Cameron), Koch, 1936, Publ. Mus. Ent. Pietro Rossi, 1:192.

The adults of this very small species are similar to those of *Cafius aguayoi* Bierig. There seems to be a slight difference in the male genitalia, the paramere of the *C. subtilis*

males being relatively shorter than that of *C. aguayoi* males. Specimens seen are all from the West Indies. Blackwelder, 1943, treated this species as distinct from the species we call *C. aguayoi*. We feel that we have seen insufficient material to suggest any change. If the 2 species are ever synonymized, the name *C. subtilis* has precedence over *C. aguayoi*.

We have examined 23 specimens.

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Orth: Division of Biological Control, Department of Entomology, University of California, Riverside, California 92521, USA. Moore: 7130 Orchard Street, Riverside, California 92504, USA.

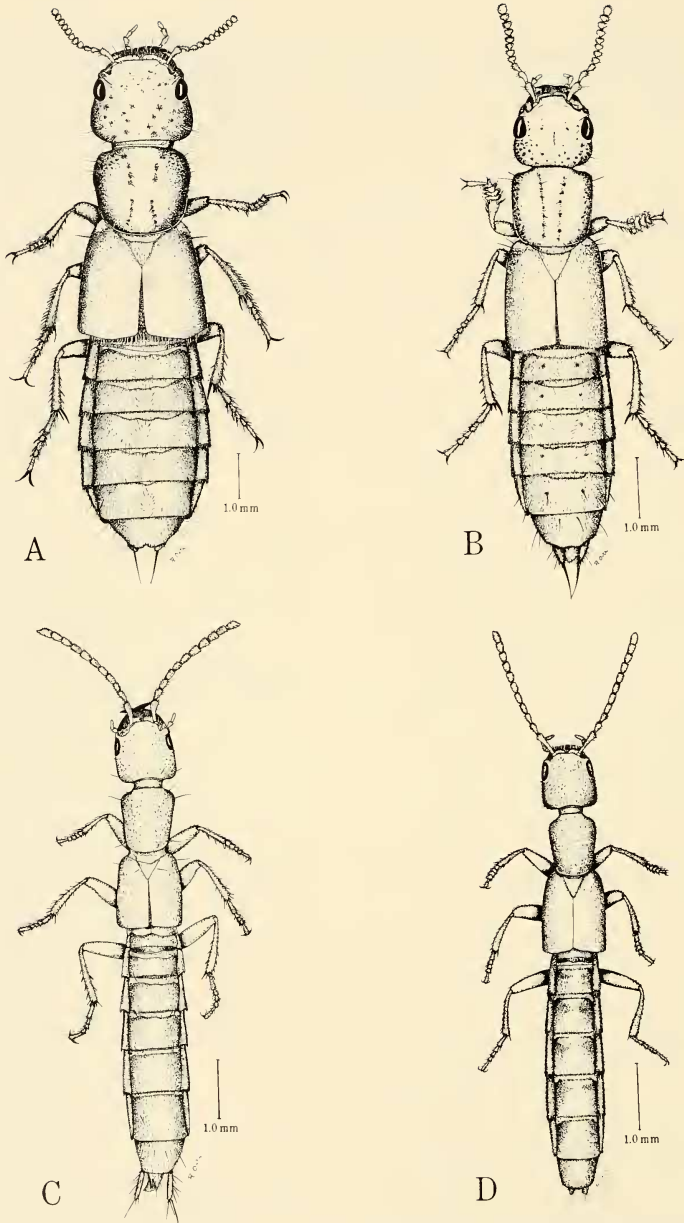


FIGURE 1. (A) *Cafius seminitens* Horn. USA, California, Santa Barbara County, Refugio State Beach, 22 April 1976, R. Orth; (B) *Cafius canescens* (Mäklin). USA, California, Santa Barbara County, Refugio State Beach, 22 April 1976, R. Orth; (C) *Cafius opacus* (LeConte). USA, California, Santa Barbara County, Refugio State Beach, 8 Nov. 1976, R. Orth; (D) *Cafius femoralis* (Mäklin). USA, California, Mendocino County, Needle Rock, 6 Oct. 1974, D. Giuliani.

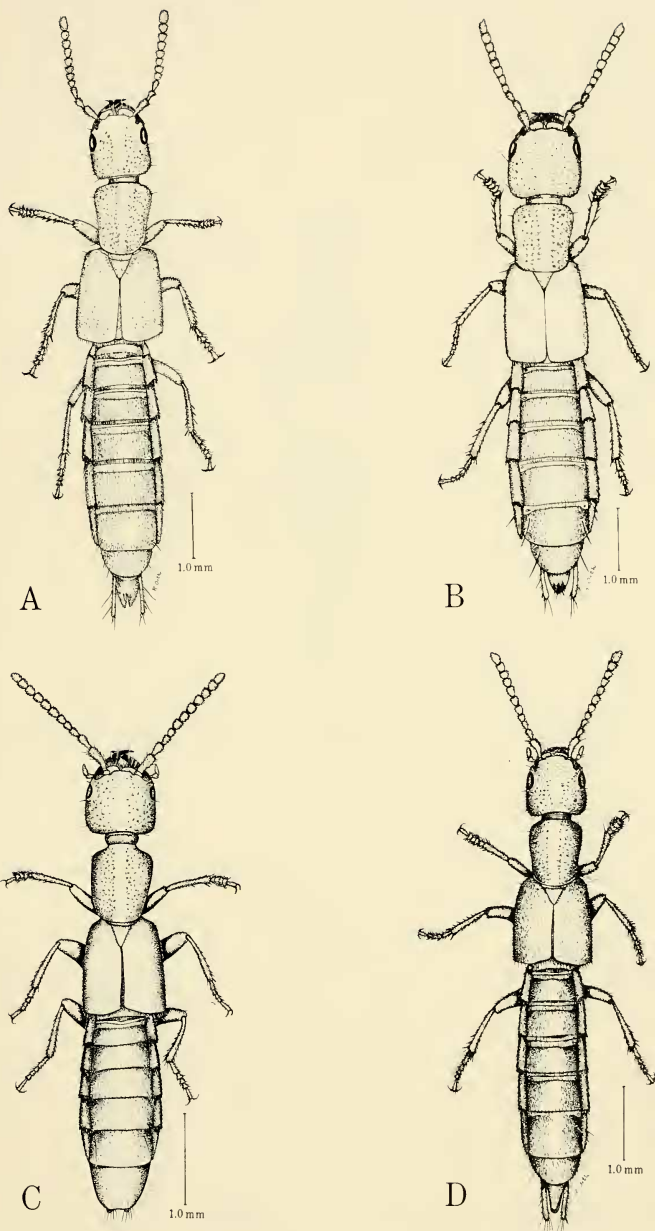


FIGURE 2. (A) *Cafius lithocharinus* (LeConte). USA, California, Santa Barbara County, Refugio State Beach, 18 May 1976, R. Orth; (B) *Cafius luteipennis* Horn. USA, California, Santa Barbara County, Refugio State Beach, 18 May 1976, R. Orth; (C) *Cafius decipiens* (LeConte). USA, California, San Diego, LeConte, Type 6290; (D) *Cafius sulcicollis* (LeConte). USA, California, Santa Barbara County, Refugio State Beach, 15 Sept. 1976, R. Orth.

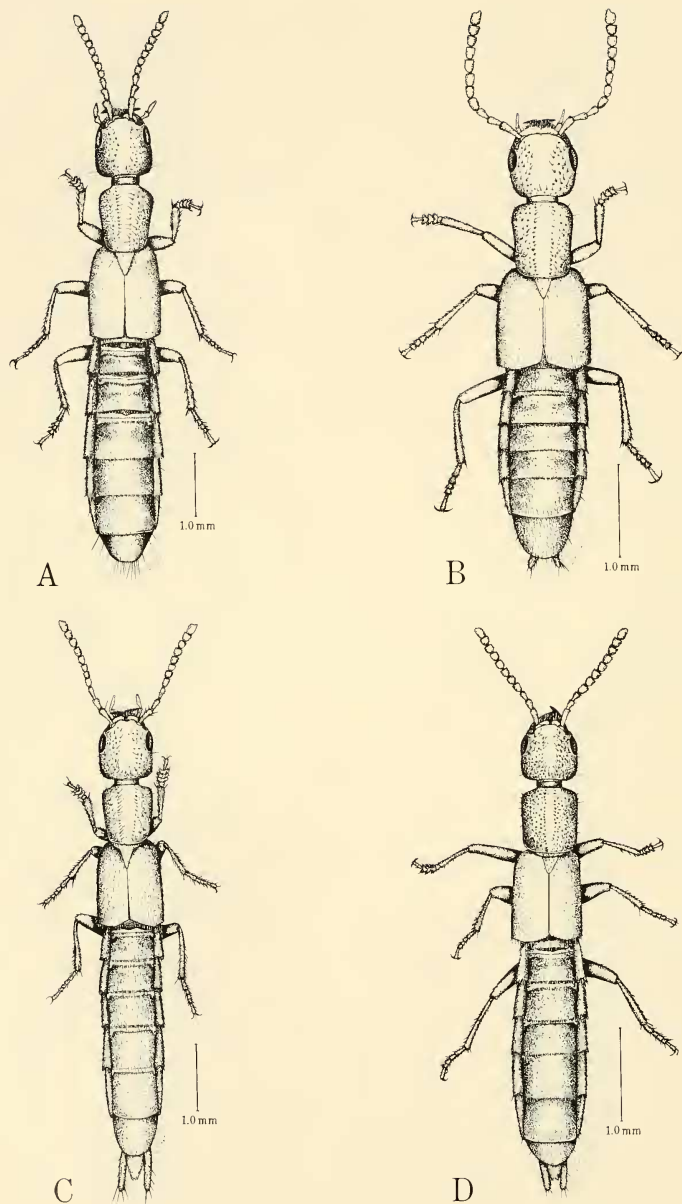


FIGURE 3. (A) *Cafius bistriatus* (Erichson). MEXICO, Sonora, El Desemboque, 23 May 1974, Brown and Speith; (B) *Cafius caribeus* Bierig. MEXICO, Nayarit, San Blas, 17-21 Sept. 1953, B. Malkin; (C) *Cafius rufifrons* Bierig. USA, Florida, Miami, June 1936, A. Bierig; (D) *Cafius aguayoi* Bierig. USA, Connecticut, Fairfield County, Westport, Sherwood Island State Park, 20 Aug. 1978, R. Orth family.

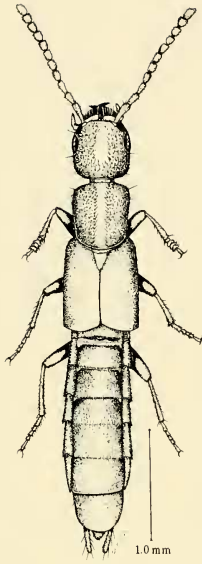


FIGURE 4. *Cafius subtilis* Cameron. CUBA, Provincia Habana, Playa Marianao, 1929, A. Bierig.

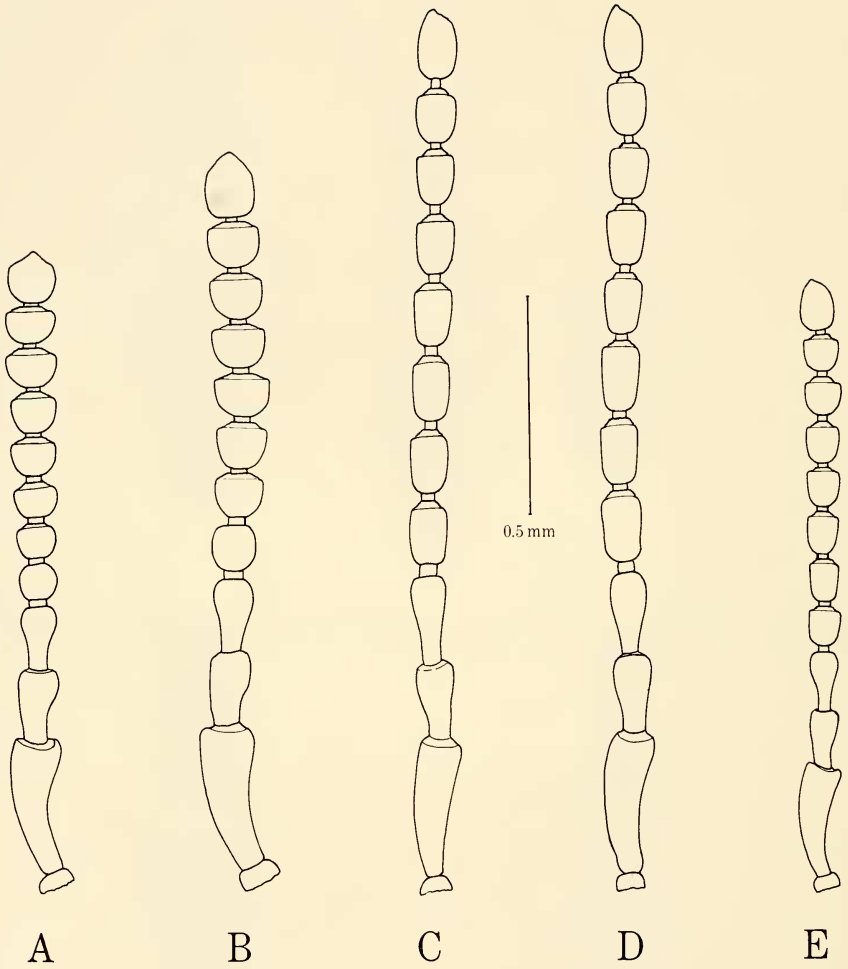


FIGURE 5. Antennae of *Cafius*. (A) *Cafius seminitens* Horn; (B) *Cafius canescens* (Mäklin); (C) *Cafius opacus* (LeConte); (D) *Cafius femoralis* (Mäklin); (E) *Cafius bistriatus* (Erichson).

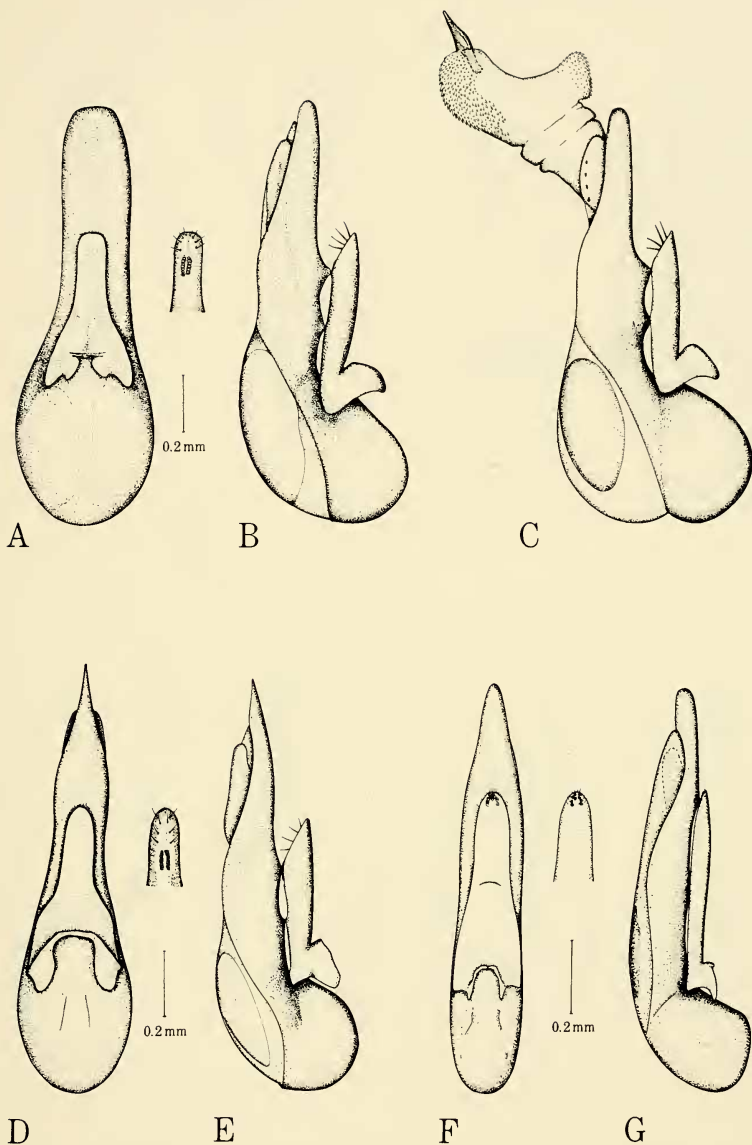


FIGURE 6. Aedeagi of *Cafius*. (A-C) *Cafius seminitens* Horn (USA, California, Santa Barbara County, Refugio State Beach, 22 April 1976, R. Orth); (A) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (B) lateral view of aedeagus; (C) lateral view of aedeagus with internal sac everted; (D, E) *Cafius canescens* (Mäklin) (USA, California, Santa Barbara County, Refugio State Beach, 19 July 1976, R. Orth); (D) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (E) lateral view of aedeagus; - (F, G) *Cafius opacus* (LeConte) (USA, California, Santa Barbara County, Refugio State Beach, 19 July 1976, R. Orth); (F) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (G) lateral view of aedeagus.

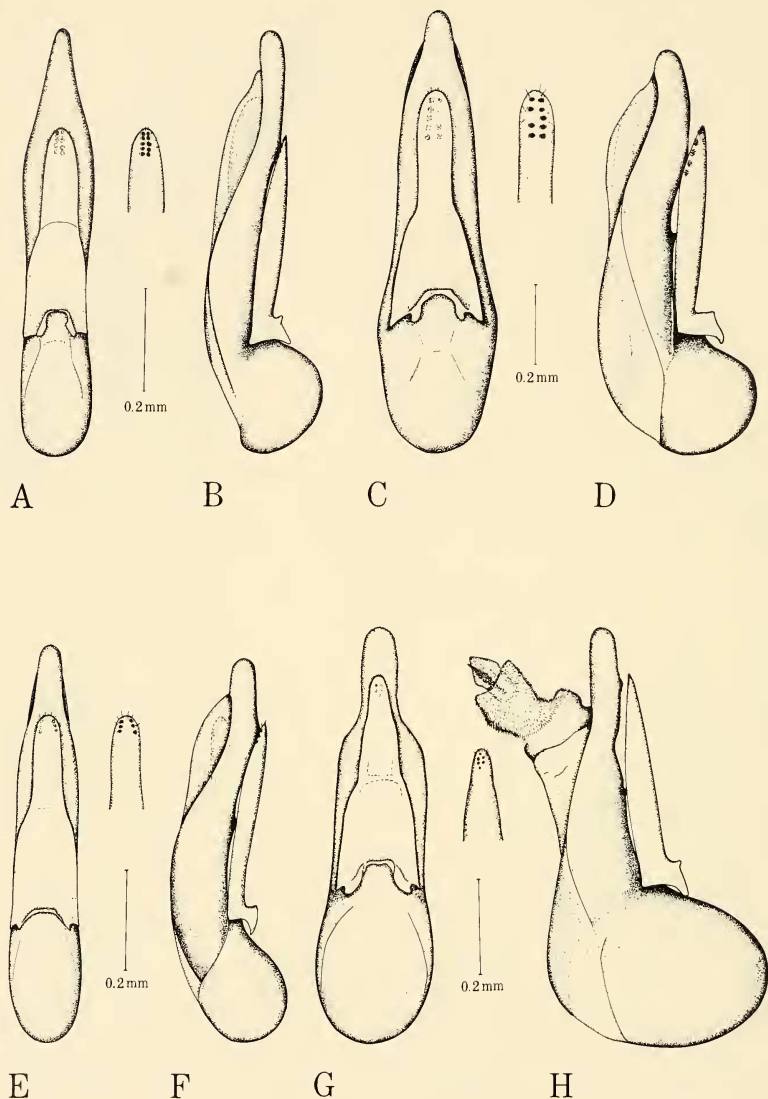


FIGURE 7. Aedeagi of *Cafius*. (A, B) *Cafius femoralis* (Mäklin) (USA, California, Mendocino County, Needle Rock, 6 Oct. 1974, D. Giuliani); (A) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (B) lateral view of aedeagus; - (C, D) *Cafius lithocharinus* (LeConte) (USA, California, Santa Barbara County, Refugio State Beach, 18 May 1976, R. Orth); (C) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (D) lateral view of aedeagus; - (E, F) *Cafius luteipennis* Horn (USA, California, Santa Barbara County, Refugio State Beach, 8 Sept. 1977, R. Orth); (E) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (F) lateral view of aedeagus; - (G, H) *Cafius decipiens* (LeConte) (USA, California, San Diego County, San Diego); (G) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (H) lateral view of aedeagus with internal sac everted.

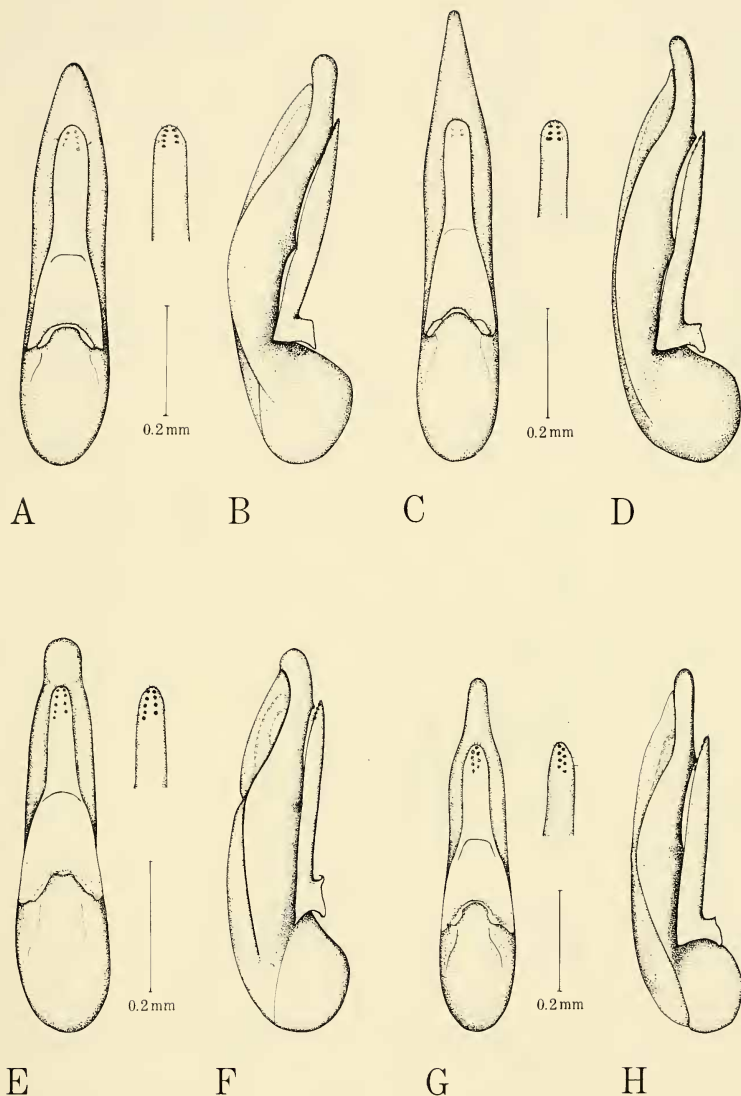


FIGURE 8. Aedeagi of *Cafius*. (A, B) *Cafius sulcicollis* (LeConte) (USA, California, Santa Barbara County, Refugio State Beach, 14 Mar. 1977, R. Orth); (A) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (B) lateral view of aedeagus; - (C, D) *Cafius bistriatus* (Erichson) (MEXICO, Sonora, El Desemboque, 23 May 1974, Brown and Speith); (C) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (D) lateral view of aedeagus; - (E, F) *Cafius caribeanus* Bierig (MEXICO, Nayarit, San Blas, 17-21 Sept. 1953, B. Malkin); (E) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (F) lateral view of aedeagus; - (G, H) *Cafius rufifrons* Bierig (CUBA, Playa Marianao, 8 Sept. 1929, A. Bierig); (G) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (H) lateral view of aedeagus.

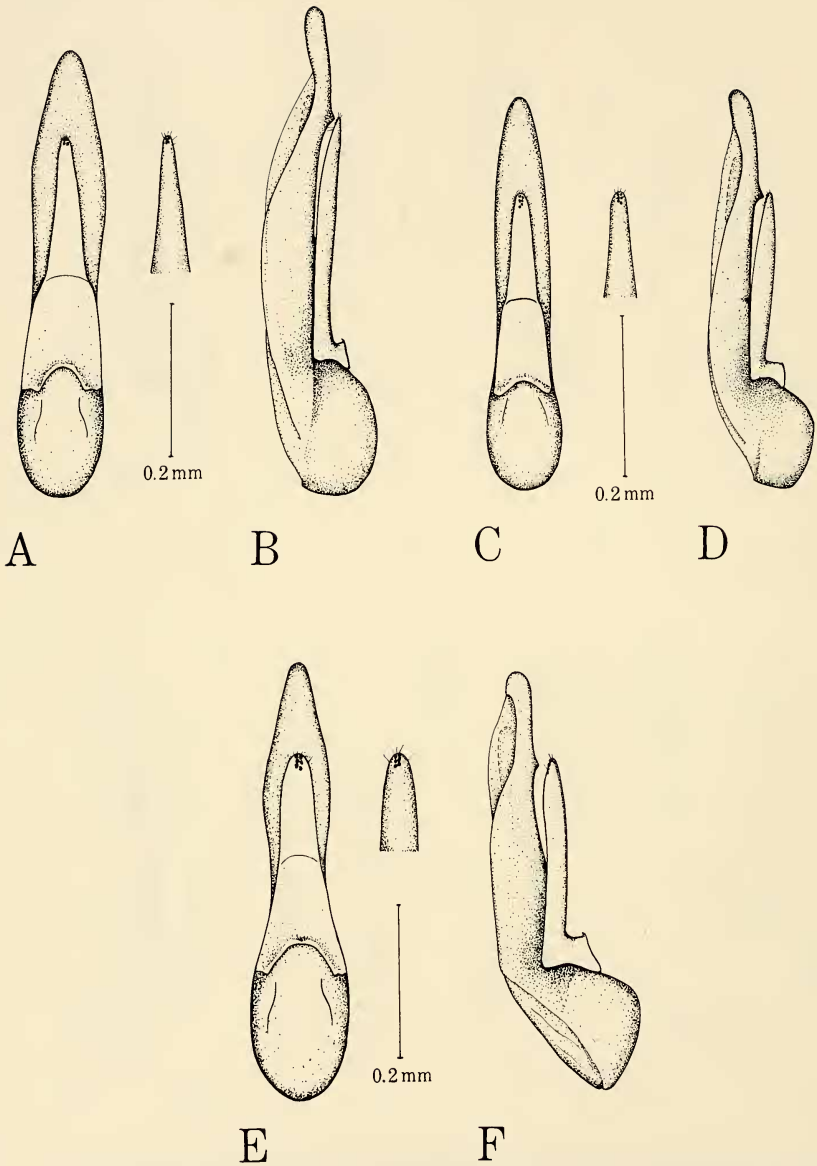


FIGURE 9. Aedeagi of *Cafius*. (A, B) *Cafius aguayoi* Bierig (USA, Connecticut, Fairfield County, Norwalk, Calf Pasture Beach, 9 Aug. 1978, R. Orth family); (A) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (B) lateral view of aedeagus; - (C, D) *Cafius subtilis* Cameron (PUERTO RICO, San Juan, 28 Sept. 1935, R. Blackwelder); (C) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (D) lateral view of aedeagus; - (E, F) *Cafius sericeus* Holme (Galliamer, Reiter, A. Fenyés collection); (E) ventral view of aedeagus and apical part of underside of paramere with sensory tubercles; (F) lateral view of aedeagus.



FIGURE 10. Map showing west coast distribution of *Cafius bistriatus* (Erichson).